PATENT ABSTRACTS OF JAPAN

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(54) INFORMATION RECORD MEDIUM, AND REPRODUCING DEVICE AND METHOD THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To reproduce music with different audio attributes smoothly and successively by arranging unit attribute information corresponding to all multiple audio information contained in a recording medium at a position where the unit attribute information are read first as multiple atttribute information.

SOLUTION: Audio attribute information which a system controller 100 read first is supplied to an audio decoder 93 as a control signal Sca and temporarily stored in an RAM 124a. When a melody is instructed to be

reproduced from a user, a system microcomputer 124 makes the digital output with present attributes and supplies each circuit 120-125 with the attribute information (an encoding system, a sampling frequency, a quantization number of bits, number of channel, and presence of absence of emphasis) corresponding to the melody, and starts setting the attributes. The system controller 100 searches for the following melody and starts reproducing it after setting of attribute alteration is complete. In a case of successive reproduction, the following setting is started immediately after the present melody ends.

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CLAIMS

[Claim(s)]
[Claim 1] The information record medium which has two or more unit audio information which should be reproduced independently mutually, the set audio information that each is constituted by said one or more unit audio information, the unit attribute information which shows the attribute of said all unit audio information included in said set audio information, and set attribute information including said unit attribute information corresponding to said all set audio information included in said record medium.

[Claim 2] Said set attribute information is an information record medium according to claim 1 arranged in the location first read in said information record medium.

[Claim 3] Said set attribute information is the sampling frequency at the time of encoding said unit audio information at least, a quantifying bit number, the number of channels, and an information record medium including the information on the existence of emphasis processing according to claim 1.

[Claim 4] Two or more unit audio information which should be reproduced independently mutually, and the set audio information that each is constituted by said one or more unit audio information, The unit attribute information which shows the attribute of said all unit audio information included in said set audio information, In the regenerative apparatus of the information record medium which has set attribute information including said unit attribute information corresponding to said all set audio information included in said record medium A reading means to read information in said information record medium, and a storage means to memorize said set attribute information read by the reading means, An input means to receive playback directions of the unit audio information which is specified by the user and which should be reproduced continuously, A playback means to reproduce the unit audio information which set up the attribute for playback based on the set attribute information memorized by said storage means, and was specified by the user according to the attribute setting out, An acquisition means by which **** and said playback means acquires the attribute corresponding to each of two or more of said specified unit audio information from said set attribute information in said storage means, A distinction means to distinguish

whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition means is the same, The regenerative apparatus promptly equipped with an attribute modification means to start attribute setting out of the following one unit audio information which should be reproduced continuously, after one playback termination of unit audio information when said distinction means distinguishes that attributes differ.

[Claim 5] Two or more unit audio information which should be reproduced independently mutually, and the set audio information that each is constituted by said one or more unit audio information, In the regenerative apparatus of the information record medium which has the unit attribute information which shows the attribute of said all unit audio information included in said set audio information A reading means to read information in said information record medium, and a table creation means to acquire said unit attribute information corresponding to said all set audio information included in said record medium by the aforementioned reading means, and to create a set attribute information table, A storage means to memorize said created set attribute information table, and an input means to receive playback directions of two or more unit audio information which is specified by the user and which should be reproduced continuously, A playback means to reproduce the unit audio information which set up the attribute for playback based on the set attribute information table memorized by said storage means, and was specified by the user according to the attribute setting out, An acquisition means by which **** and said playback means acquires the attribute corresponding to each of two or more of said specified unit audio information from said set attribute information table in said storage means, A distinction means to distinguish whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition means is the same, The information regenerative apparatus promptly equipped with an attribute modification means to start attribute setting out of the following one unit audio information which should be reproduced continuously, after one playback termination of unit audio information when said distinction means distinguishes that attributes differ.

[Claim 6] Said playback means is the regenerative apparatus according to claim 4 or 5 which has a search means make playback termination **** of said one unit audio information move the aforementioned reading means to the record location on said information record medium of said following one unit audio information, and make reading of said following one unit audio information start from the record location after moving after progress of a predetermined standby time from migration initiation.

[Claim 7] Said standby time is a regenerative apparatus according to claim 6 which is time amount longer than the time amount which modification of attribute setting out by said attribute modification means takes.

[Claim 8] Two or more unit audio information which should be reproduced independently mutually, and the set audio information that each is constituted by said one or more unit audio information, The unit attribute information which shows ****** of said all unit audio information included in said set audio information, In the playback approach of an information record medium of having set attribute information including said unit attribute information corresponding to said all set audio information included in said record medium The storage process which reads said set attribute information in said information record medium, and is memorized in the storage section, The input process which receives playback directions of two or more unit audio information which is specified by the user, and which should be reproduced continuously, The playback process which reproduces the unit audio information which set up the attribute for playback based on the set attribute information memorized by said storage section, and was specified by the user according to the attribute setting out, The acquisition process at which it **** and said playback process acquires the attribute corresponding to each of two or more of said specified unit audio information from said set attribute information in said storage section, The distinction process which distinguishes whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition process is the same, The playback approach promptly equipped with the attribute modification process which starts attribute setting out of the following one unit audio information which should be reproduced continuously

after one playback termination of unit audio information when it is distinguished that an attribute changes with said distinction processes.

[Claim 9] Two or more unit audio information which should be reproduced independently mutually, and the set audio information that each is constituted by said one or more unit audio information, In the playback approach of an information record medium of having the unit attribute information which shows the attribute of said all unit audio information included in said set audio information The table creation process which reads said unit attribute information corresponding to said all set audio information included in said record medium, and creates a set attribute information table, The storage process which memorizes said set attribute information table created by said table creation process in the storage section, The input process which receives playback directions of two or more unit audio information which is specified by the user, and which should be reproduced continuously, The playback process which reproduces the unit audio information which set up the attribute for playback based on the set attribute information table memorized by said storage section, and was specified by the user according to the attribute setting out, The acquisition process at which it **** and said playback process acquires the attribute corresponding to each of two or more of said specified unit audio information from said set attribute information table in said storage section, The distinction process which distinguishes whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition process is the same, The playback approach of having promptly the attribute modification process which starts attribute setting out of the following one unit audio information which should be reproduced continuously after one playback termination of unit audio information when an attribute changing with said distinction processes distinguishes.

[Claim 10] Said playback process is the playback approach according to claim 8 or 9 of having the migration search process of making playback termination **** of said one unit audio information moving a reading means to the record location on said information record medium of said following one unit audio information, and making reading of said following one unit audio information

starting from the record location after moving after progress of a predetermined standby time from migration initiation.

[Claim 11] Said standby time is the playback approach according to claim 10 which is time amount longer than the time amount which modification of attribute setting out by said attribute modification process takes.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention belongs information represented by DVD, such as an image and voice, to the technical field of the regenerative apparatus for reproducing information from an information record medium and the information record media concerned, such as a high density optical disk recordable on high density.

[0002]

[Description of the Prior Art] Conventionally, as an optical disk with which information, such as an image and voice, was recorded, so-called LD (Laser Disk), CD (Compact Disk), etc. have become common widely.

[0003] In such LD etc., image information and speech information are recorded with the hour entry which shows the time of day which should reproduce each information on the basis of the playback starting position which each LD etc. has. For this reason, playback of extracting and listening to only music listening to among two or more music currently recorded [in / it is / which it is reproduced in the sequence that the information currently recorded is recorded / general, and / others, for example, CD,], or changing playback sequence at random, and hearing it is usually possible. [playback]

[0004] However, in Above LD etc., the viewer had a selection branch about the image displayed or the voice reproduced, and the playback which was rich in the so-called interactive change of the viewer concerned choosing, viewing

and listening to them had the trouble that it could not do.

[0005] Namely, when viewing and listening to the foreign film currently recorded on LD, [for example,] The language used in the title currently displayed on the screen is chosen. (Choosing a Japanese title and the title of a sale order online processing system) the case where the music which is made to display or is recorded on CD is heard -- the sound -- easy voice can be chosen (for example, it chooses whether it is heard by English words, or it is heard by Japanese words)

[0006] although the proposal about DVD and the development which are the optical disk which raised memory capacity by about 10 times on the other hand, without changing the magnitude of the optical disk itself to the above-mentioned conventional CD now are prosperous, if voice etc. is recorded in the title and two or more language of the above-mentioned plurality to this DVD, a viewer will choose it -- the above -- it also becomes possible to enjoy the playback which was rich in an interactive change.

[0007]

[Problem(s) to be Solved by the Invention] In Above DVD, in case two or more music information is recorded, the information from which attributes (it is hereafter called an "audio attribute".), such as existence of the coding method of the music information, a sampling frequency, a quantifying bit number, the number of channels, and emphasis, differ can be made intermingled on the disk of one sheet, and can be recorded.

[0008] however -- the time of reproducing the music information from which these audio attribute differs -- a regenerative apparatus -- ******** -- it is necessary to perform playback actuation corresponding to an audio attribute For example, when outputting music information by the loudspeaker, it is necessary to carry out the digital to analog of the audio information recorded on DVD, and to supply amplifier and a pan as an analog signal to a loudspeaker. In this case, when the sampling frequencies of the musical piece which it is going to reproduce continuously differ (the 1st music is 48kHz and the 2nd music is 96 etc.kHz etc.), after playback of the 1st music, a regenerative apparatus will receive and begin the data of the 2nd music, will notice change of a sampling frequency, and will start the processing which

changes the clock frequency of a D/A converter into 96kHz. However, since a certain amount of time amount is required for a circuit (PLL circuit) to lock in the frequency after modification, modification of a frequency is not of use for initiation of the 2nd music, and the nonconformity of it becoming impossible to reproduce a head part correctly etc. may arise. Such a problem may be produced not only with modification of a sampling frequency but with modification of various audio attributes, such as modification of the existence of a quantifying bit number and emphasis.

[0009] This invention was made in view of the above point, and when two or more musical pieces from which an audio attribute differs are recorded, in case the technical problem reproduces the musical piece of a different audio attribute continuously, it is to offer the information record medium with which this music information was recorded in the record mode which can be reproduced correctly and smoothly according to each attribute.

[0010] Moreover, other technical problems of this invention are from the information record medium with which music information was recorded in the above modes to offer the information regenerative apparatus which reproduces information.

[0011]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, invention according to claim 1 Two or more unit audio information which should be reproduced independently mutually, and the set audio information that each is constituted by said one or more unit audio information, It constitutes so that it may have the unit attribute information which shows the attribute of said all unit audio information included in said set audio information, and set attribute information including said unit attribute information corresponding to said all set audio information included in said record medium.

[0012] According to the information record medium constituted as mentioned above, two or more unit audio information and the set audio information constituted by those sets are recorded. Moreover, the unit attribute information which shows the attribute of each unit audio information is recorded, and the unit attribute information corresponding to all the set audio

information on the record medium concerned is further recorded as set attribute information. Therefore, the attribute of all unit audio information can be acquired easily and promptly by referring to set attribute information.

[0013] In an information record medium according to claim 1, invention according to claim 2 is constituted so that it may be arranged in the location where said set attribute information is first read in said information record medium. Therefore, if a regenerative apparatus is equipped with an information record medium, said set attribute information will be read first and the playback control based on the information concerned will be attained.

[0014] In an information record medium according to claim 1, invention according to claim 3 constitutes said set attribute information so that the information on the sampling frequency at the time of encoding said unit audio information at least, a quantifying bit number, the number of channels, and the existence of emphasis processing may be included. Therefore, a regenerative apparatus can acquire this information easily and the quick playback of it is attained.

[0015] Two or more unit audio information that invention according to claim 4 should be reproduced independently mutually, The set audio information that each is constituted by said one or more unit audio information, The unit attribute information which shows the attribute of said all unit audio information included in said set audio information, In the regenerative apparatus of the information record medium which has set attribute information including said unit attribute information corresponding to said all set audio information included in said record medium A reading means to read information in said information record medium, and a storage means to memorize said set attribute information read by the reading means, An input means to receive playback directions of the unit audio information which is specified by the user and which should be reproduced continuously, A playback means to reproduce the unit audio information which set up the attribute for playback based on the set attribute information memorized by said storage means, and was specified by the user according to the attribute setting out, An acquisition means by which **** and said playback means acquires the attribute corresponding to each of two or more of said specified

unit audio information from said set attribute information in said storage means, A distinction means to distinguish whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition means is the same, When said distinction means distinguishes that attributes differ, it constitutes promptly after one playback termination of unit audio information so that it may have an attribute modification means to start attribute setting out of the following one unit audio information which should be reproduced continuously.

[0016] Moreover, two or more unit audio information which should be reproduced independently mutually according to invention according to claim 8, The set audio information that each is constituted by said one or more unit audio information, The unit attribute information which shows ****** of said all unit audio information included in said set audio information, In the playback approach of an information record medium of having set attribute information including said unit attribute information corresponding to said all set audio information included in said record medium The storage process which reads said set attribute information in said information record medium, and is memorized in the storage section, The input process which receives playback directions of two or more unit audio information which is specified by the user, and which should be reproduced continuously, The playback process which reproduces the unit audio information which set up the attribute for playback based on the set attribute information memorized by said storage section, and was specified by the user according to the attribute setting out, The acquisition process at which it **** and said playback process acquires the attribute corresponding to each of two or more of said specified unit audio information from said set attribute information in said storage section, The distinction process which distinguishes whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition process is the same, When it is distinguished that an attribute changes with said distinction processes, it constitutes promptly after one playback termination of unit audio information so that it may have the attribute modification process which starts attribute setting out of the following one unit audio information which should be reproduced continuously.

[0017] According to the regenerative apparatus or the playback approach constituted as mentioned above, first, said set attribute information is read in said information record medium, and the storage section memorizes. Next, playback directions of two or more unit audio information which is specified by the user and which should be reproduced continuously are inputted, the attribute for playback is set up based on the set attribute information memorized by the storage section, and the unit audio information specified by the user according to the attribute setting out is reproduced. In playback, it is distinguished whether the attribute corresponding to said unit audio information which should be reproduced continuously that the attribute corresponding to each of two or more of said specified unit audio information was acquired from said set attribute information in said storage section, and was acquired by said acquisition process is the same. And when it is distinguished that attributes differ, attribute setting out of the following one unit audio information which should be reproduced continuously is promptly started after one playback termination of unit audio information.

[0018] Therefore, the attributes of the unit audio information which should be reproduced continuously differ, even when setting-out modification which corresponds in a regenerative apparatus is needed, the attribute of the unit audio information which should be reproduced next can acquire from set attribute information promptly, and a setting-out change of a regenerative apparatus is made easily and promptly.

[0019] Two or more unit audio information that invention according to claim 5 should be reproduced independently mutually, In the regenerative apparatus of the information record medium which has the set audio information that each is constituted by said one or more unit audio information, and the unit attribute information which shows the attribute of said all unit audio information included in said set audio information A reading means to read information in said information record medium, and a table creation means to acquire said unit attribute information corresponding to said all set audio information included in said record medium by the aforementioned reading means, and to create a set attribute information table, A storage means to memorize said created set attribute information table, and an input means to

receive playback directions of two or more unit audio information which is specified by the user and which should be reproduced continuously, A playback means to reproduce the unit audio information which set up the attribute for playback based on the set attribute information table memorized by said storage means, and was specified by the user according to the attribute setting out, An acquisition means by which **** and said playback means acquires the attribute corresponding to each of two or more of said specified unit audio information from said set attribute information table in said storage means, A distinction means to distinguish whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition means is the same, When said distinction means distinguishes that attributes differ, it constitutes promptly after one playback termination of unit audio information so that it may have an attribute modification means to start attribute setting out of the following one unit audio information which should be reproduced continuously.

[0020] Moreover, two or more unit audio information that invention according to claim 9 should be reproduced independently mutually, In the playback approach of an information record medium of having the set audio information that each is constituted by said one or more unit audio information, and the unit attribute information which shows the attribute of said all unit audio information included in said set audio information The table creation process which reads said unit attribute information corresponding to said all set audio information included in said record medium, and creates a set attribute information table, The storage process which memorizes said set attribute information table created by said table creation process in the storage section, The input process which receives playback directions of two or more unit audio information which is specified by the user, and which should be reproduced continuously, The playback process which reproduces the unit audio information which set up the attribute for playback based on the set attribute information table memorized by said storage section, and was specified by the user according to the attribute setting out, The acquisition process at which it **** and said playback process acquires the attribute corresponding to each of two or more of said specified unit audio information

from said set attribute information table in said storage section, The distinction process which distinguishes whether the attribute corresponding to said unit audio information which should be reproduced continuously acquired by said acquisition process is the same, When that an attribute changes with said distinction processes distinguishes, it is promptly constituted after one playback termination of unit audio information so that it may have the attribute modification process which starts attribute setting out of the following one unit audio information which should be reproduced continuously.

[0021] According to the regenerative apparatus or the playback approach constituted as mentioned above, said unit attribute information corresponding to said all set audio information included in said record medium is first read in an information record medium, a set attribute information table is created, and the storage section memorizes. Next, playback directions of two or more unit audio information which is specified by the user and which should be reproduced continuously are inputted, the attribute for playback is set up based on the set attribute information table memorized by the storage section, and the unit audio information specified by the user according to the attribute setting out is reproduced. In playback, it is distinguished whether the attribute corresponding to said unit audio information which should be reproduced continuously that the attribute corresponding to each of two or more of said specified unit audio information was acquired from said set attribute information table in said storage section, and was acquired by said acquisition process is the same. And when it is distinguished that attributes differ, attribute setting out of the following one unit audio information which should be reproduced continuously is promptly started after one playback termination of unit audio information.

[0022] Therefore, the attributes of the unit audio information which should be reproduced continuously differ, even when setting-out modification which corresponds in a regenerative apparatus is needed, the attribute of the unit audio information which should be reproduced next can acquire from set attribute information promptly, and a setting-out change of a regenerative apparatus is made easily and promptly.

[0023] Invention according to claim 6 is set to a regenerative apparatus

according to claim 4 or 5. Said playback means Playback termination **** of said one unit audio information is made to move the aforementioned reading means to the record location on said information record medium of said following one unit audio information. It constitutes so that it may have a search means to make reading of said following one unit audio information start from the record location after moving after progress of a predetermined standby time from migration initiation.

[0024] Invention according to claim 10 moreover, said playback process Playback termination **** of said one unit audio information is made to move a reading means to the record location on said information record medium of said following one unit audio information in the playback approach according to claim 8 or 9. It constitutes so that it may have the migration search process of making reading of said following one unit audio information starting from the record location after moving after progress of a predetermined standby time from migration initiation.

[0025] According to the regenerative apparatus and approach which were constituted as mentioned above, after playback of one unit audio information is completed, a reading means is moved to the record location of the unit audio information which should be reproduced next, and playback of the unit audio information concerned is started after predetermined standby-time progress from migration initiation. Therefore, even when the attribute of the unit audio information which should be reproduced next changes, it is secured that playback is started after modification of the attribute corresponding to it is completed.

[0026] Invention according to claim 7 makes said standby time time amount longer than the time amount which modification of attribute setting out by said attribute modification means takes in a regenerative apparatus according to claim 6. Moreover, invention according to claim 11 makes said standby time time amount longer than the time amount which modification of attribute setting out by said attribute modification process takes in the playback approach according to claim 10. Therefore, when the unit audio information that attributes differ is reproduced continuously, before attribute setting-out modification by the side of a regenerative apparatus is completed, it is lost

that playback of the following unit audio information is started, and shift of the information reproduced is performed smoothly.

[0027]

[Embodiment of the Invention] Below, the gestalt of the suitable operation for this invention is explained. In addition, the gestalt of the operation explained below explains the gestalt of the operation which applied this invention to Above DVD.

[0028] In addition, in the gestalt of the following operations, an example of each component in the claim shown in the left-hand side of the following list consists of elements shown in the right-hand side of the following list, respectively.

[0029]

Unit audio information: Truck (it corresponds to PGC)

Set audio information: Group (it corresponds to VTS)

Unit attribute information : Audio attribute information in each VTS Set attribute information : Drawing 1 thru/or drawing 6 are used and explained to the physical and logical configuration list of DVD which is the operation gestalt of the information record medium concerning this invention about the actuation at the beginning of the physics of the gestalt DVD of operation of the audio attribute (information I) information record medium in audio concentration information, and a logical format.

[0030] Introduction, image information, and speech information (music information is also included.) Hereafter, the record format on DVD [being the same] (physical record format) is explained using drawing 1 .

[0031] First, as shown in drawing 1 , DVD1 of an operation gestalt has the lead-out area LO in the outermost periphery while having the lead-in groove area LI in the most-inner-circumference section, and is divided and recorded on two or more VTS(Video Title Set) 3 (VTS#1 thru/or VTS#n) to which image information and speech information have ID (discernment) number in each in the meantime. here, it is connected with VTS (the number of the speech information contained in it, and subimage information --) Attributes, such as a specification and response language, are the sets (settlement) which put together the same title (one work which manufacturers, such as a film, are

going to show to a viewer). More specifically for example, two or more films which have the words of different language etc. about the one same film are alike, respectively, and it is recorded as a title, or even if it is the same film, the theater version and an special edition are recorded as a respectively different title. Moreover, the video manager 2 is recorded on the head of the field where VTS3 is recorded. The image information by which the information recorded as this video manager 2 is recorded on DVDs1 concerned, such as a menu in which the identifier of each title is shown, and an access table for accessing the information for illegal copy prevention or each title, and the whole speech information information are recorded.

[0032] VTS3 of 1 is divided and recorded on two or more VOB10 which has an ID number in each by making CDC 11 into a head. Here, the part constituted by two or more VOB10 is called VOB set (VOBS). This VOB set is considered as a VOB set about the stereo part concerned, in order to distinguish CDC 11 which are other data which constitute VTS3, and two or more parts of VOB10 which are the stereos of image information and speech information.

[0033] Information, such as PGCI (Program Chain Information) which are the various information about the program chain which is the logical partition which combined two or more cels (it mentions later about a cel.), is recorded on CDC 11 recorded on the head of VTS3. Moreover, the stereo parts (the images or the voice (itself) other than control information) of image information and speech information other than control information are recorded on each VOB10.

[0034] Furthermore, VOB10 of 1 is constituted by two or more cels 20 which have an ID number in each. Here, VOB10 of 1 is constituted so that it may complete by two or more cels 20, and the cel 20 of 1 does not straddle two VOB(s)10.

[0035] The cel 20 of 1 is constituted by two or more VOB units (VOBU) 30 which have an ID number in each. Here, it is one unit only by either or the below-mentioned Navi-pack of image information, speech information, and subimage information (the information on subimages, such as a title in a film, is said.) constituted in the VOB unit 30.

[0036] And the VOB unit 30 of 1 is constituted by Navi-pack 41 in which the control information which makes a controlled system image information included in the VOB unit 30 is stored, the video pack 42 containing the video data as image information, the audio pack 43 containing the audio data as speech information, and the subpicture pack 44 containing the subpicture data as subimage information. Here, only image data are recorded as a video data and only voice data is recorded as audio data. Moreover, as subpicture data, only graphical data, such as an alphabetic character as a subimage and a graphic form, are recorded. In addition, the number of voice recordable on DVD1 is eight, and it is defined on specification that there are 32 classes of recordable subimage.

[0037] Moreover, the playback time amount (playback time amount corresponding to the data currently recorded between Navi-pack 41 of 1 and Navi-pack 41 which adjoins Navi-pack 41 concerned of 1) corresponding to the VOB unit 30 of 1 is recorded as having the die length for 0.4 seconds or more.

[0038] Furthermore, in the VOB unit 30 of 1, although Navi-pack 41 surely exists in the head, also when each of the video pack 42, the audio pack 43, and the subpicture pack 44 does not necessarily need to exist in the VOB unit 30 and it exists, the number and sequence can be set as arbitration.

[0039] Here, generally each partition of the video pack 42 shown in drawing 1 , the audio pack 43, and the subpicture pack 44 is called pack P. That is, in the VOB unit 30 of 1, a video data, audio data, and subpicture data are divided and recorded on Pack P, respectively. These packs P are record units set up corresponding to the pack processing in the MPEG 2 method used in case recording information is recorded on DVD1 of the gestalt of this operation.

[0040] furthermore, reading appearance carries out and the start code which shows the thing which is called the SCR on the playback time-axis which should carry out reading appearance of the data contained in each pack P from the track buffer in the below-mentioned regenerative apparatus, and should start the input to each buffer (System Clock Reference) which carries out reading appearance and shows start time, and which are initiation time information and initiation of a pack P is recorded on the pack header recorded

on the head of each pack P. Moreover, about each above-mentioned pack P, although a video data, audio data, and subpicture data are usually recorded for every packet which is the record unit which subdivided the pack P concerned further, generally the pack P of 1 is constituted from DVD1 in the gestalt of this operation by the packet of 1.

[0041] Retrieval information for Navi-pack 41 to search at the last an image or voice etc. which carries out a repeat display The DSI (Data Search Information) data 51 which (are specifically the address on DVD1 with which image concerned or voice etc. which carries out a repeat display is recorded etc.), It is constituted by the PCI (Presentation Control Information) data 50 which are the information about the repeat display control at the time of carrying out [voice / which was searched based on the DSI data 51 / the image or voice] a repeat display. At this time, the DSI data 51 and the PCI data 50 constitute a DSI packet and a PCI packet as a packet PT, respectively, and are recorded.

[0042] Furthermore, all the video packs 42 included in the VOB unit 30 of 1 are constituted by 1 or two or more GOP(s) (Group Of Picture). Above GOP is the minimum image unit refreshable [independent / which is defined in the specification of the MPEG 2 (Moving Picture Experts Group 2) method which is a picture compression method adopted in case image information is recorded on DVD1 in the gestalt of this operation].

[0043] Each partition carries out partition setting out, and the manufacturer (only henceforth a manufacturer) of recording information who makes it record in DVD1 makes it record free according to the intention in a record format of the layered structure shown in drawing 1 explained above. By reproducing based on the below-mentioned logical structure for every partitions of these, it becomes reproducible [the versatility which was rich in change].

[0044] Next, the logical format (logical structure) which combined the information recorded by the physical partition shown in drawing 1 is explained using drawing 2 . In addition, the information (access information or hour entry) for reproducing the logical structure shown in drawing 2 combining each data (especially cel 20) shown in drawing 1 by the logical structure which information is not actually recorded on DVD1 with the structure, and is

shown in drawing 2 is the things on DVD1 currently recorded especially in CDC 11.

[0045] When it explains from the hierarchy of the low order of drawing 2 , for clarification of explanation, the program 60 of 1 is constituted on logic based on an intention of a manufacturer by choosing and combining two or more cels 20 among the physical structures explained in above-mentioned drawing 1 . This program 60 is also the minimum logical unit which the system controller in the below-mentioned regenerative apparatus identifies a partition, and can access with a command. In addition, a manufacturer can also give a definition as a smallest unit which a viewer can choose freely 1 or the summarized thing, and can view and listen to this program 60, and this unit is called PTT (Part Of Title).

[0046] Moreover, a manufacturer is able to perform usage **** of the so-called cel 20 which the cel 20 of 1 is used [****], namely, reproduces the cel 20 of 1 in two or more different programs 60 by two or more programs 60 from the program 60 of 1 choosing two or more cels 20, and being constituted logically.

[0047] Here, about the number of the cel 20 of 1, in case it is dealt with as a cel ID number in case the cel 20 concerned is dealt with in the physical format shown in drawing 1 (it is indicated as cel ID# among drawing 1 .), and it is dealt with in the logical format shown in drawing 2 , it is dealt with as a cel number in order of the description in the below-mentioned PGCI.

[0048] Next, PGC (Program Chain)61 of 1 is constituted on logic based on an intention of a manufacturer combining two or more programs 60. PGCI mentioned above is defined by this unit of PGC61. To the PGCI concerned Playback sequence of the cel 20 for every program 60 at the time of reproducing each program 60 (the program number of a proper is assigned every program 60 by this playback sequence.) The number of the address which is a record location on DVD1 of each cel 20, and the head cel 20 in the program 60 of 1 which should be reproduced, the playback system of each program 60, and various commands (it is [PGC61 or] the command which a manufacturer can specify every cel 20) are contained. In addition, although the record location on DVD1 of PGCI is in CDC 11 (refer to drawing 1) as above-mentioned, when the PGCI concerned is PGCI about the menu in the

video manager 2, the record location of the PGCI concerned is in CDC (refer to drawing 4) contained in the video manager 2.

[0049] moreover, data, such as an ontic image and voice, will be contained in PGC61 of 1 as combination of a cel 20 if it puts in another way -- as combination of a program 60 besides Above PGCI.

[0050] Furthermore, in PGC61 of 1, it is [that the cel 20 shown in the explanation in the above-mentioned program 60 uses also about (that is, use the same cel 20 by different PGC61.)] possible. Moreover, about the cel 20 to be used, a manufacturer can choose the approaches (for example, the cel 20 currently recorded later is reproduced previously) (playback of a discontinuous arrangement cel) of reproducing regardless of the sequence memorized by DVD1 other than the approach (playback of a continuous-line-arrangement cel) of reproducing a cel 20 in the sequence memorized by DVD1.

[0051] Next, the title 62 of 1 is constituted by 1 or two or more PGC61 on logic. This title 62 will be a unit equivalent to one album, if it says for example, for image information and will say for one film and music information, and it is completed information which a manufacturer wants to offer to the viewer of DVD1.

[0052] And VTS63 of 1 is constituted by 1 or two or more titles 62 on logic. The title 62 contained in this VTS63 has an attribute common to each, and the film of the language which makes a mistake in receiving the one same film, two or more albums twisted for one music artist will be equivalent to each title 62.

[0053] Moreover, the information equivalent to VTS63 of 1 shown in drawing 2 is equivalent to the information included in VTS3 of 1 shown in drawing 1 . That is, in VTS63 shown in DVD1 at drawing 2 , all the information included on logic will collect as VTS3 of 1, and will be recorded.

[0054] When a manufacturer specifies the information classified in the physical structure based on the logical format explained above, an outstanding image or music is formed for a viewer.

[0055] Since it is necessary to record the information of various hierarchies who explained above, the recording information which has an above-

mentioned record format is suitable for especially the information record medium that has the big storage capacity [title / corresponding to the film concerned / record one film and also / voice or a title] which can also record the voice or the title of two or more kinds of language on the same optical disk like the above DVD 1.

the content of the audio DVD -- as mentioned above, on DVD, video information, text, audio information, etc. can be made intermingled, and it can record. When recording a film etc. on DVD, the video information on a film and the audio information corresponding to this become a pair, and are recorded, and a title etc. is further recorded as subpicture information if needed. On the other hand, only audio information may be recorded like CD on DVD, and video information is not fundamentally recorded on DVD in that case (such a DVD is hereafter called "Audio DVD".). In this case, the VOB unit 30 shown in drawing 1 consists of Navi-pack 41 and two or more audio packs 43, and, more specifically, a video pack and a subpicture pack are not included fundamentally (however, the video information on some [for song selection the text for music introduction, publicity, etc.] may be included). Since especially this invention relates to audio information, with the following operation gestalten, only audio information shall be recorded on DVD.

[0056] Before explaining the detail of an embodiment, the record mode of the audio information on Audio DVD is explained roughly. Audio DVD has quite large storage capacity compared with CD, and can record the music information equivalent to two or more CDs in DVD of one sheet. On Audio DVD, a settlement of audio information which is equivalent to CD of one sheet will be called a "group." For example, suppose that there is an audio DVD which collected two or more original copy albums of Beatles. In this case, in the audio DVD concerned, the album of plurality (for example, four sheets), such as "Let It Be" and "Abbey Road", is contained. The audio information corresponding to each album of this is recorded as each title set (refer to VTS3 and drawing 1). For example, "Let It Be" is condition that it is recorded on VTS#1 and "Abbey Road" is recorded on VTS#2. Therefore, each settlement of the audio information corresponding to each album corresponds to a "group" in this case.

[0057] Although the album of one sheet supports one group in the above-mentioned example, a settlement of the audio information collected based on the existing theme can constitute a group. For example, supposing "the collection of JONRENON vocals" (for example, referred to as VTS#5) to which JONRENON other than two or more original copy albums collected the music which takes the lead vocal on the above-mentioned DVD, or the collection of music, such as "a collection of the Paul McCartney vocals" (for example, referred to as VTS#6), is recorded, this each also constitutes a "group" and corresponds to one VTS, respectively. However, in this case, the music belonging to two or more above-mentioned original copy albums is only reproduced, as audio information on DVD, the music in two or more above-mentioned original copy albums does not overlap in VTS#5 and #6, and actual music is not necessarily recorded. Therefore, as information in VTS#5 and #6, only playback control information recorded on VTS#1, #2, etc., such as the address of audio information and an attribute, will be recorded, and the ontic audio information which belongs to VTS#1 and #2 with reference to the control information concerned will perform playback of music. In addition, the meetings (collection of OO etc.) of the audio information created based on a certain theme etc. as mentioned above are also called a "collection." Therefore, it can also be said that a "collection" is a group including the ontic information recorded on the group (VTS) from whom self differs.

[0058] Moreover, a "group" can think that it corresponds to a settlement of the music which a user recognizes. In the above-mentioned example, the original copy album of four sheets and two collections are recorded on DVD of one sheet. In this case, as a content list attached to the DVD concerned, a different album of a total of six sheets will be contained. Actually, although the ontic information on two collections is constituted by the music contained in the original copy album of four sheets, and ontic audio information does not overlap and is not necessarily recorded, a user does not recognize such a situation but recognizes it as a different album of six sheets being recorded on DVD of one sheet. Therefore, a settlement of the music a user recognizes a group to be can be considered irrespective of the record condition of the ontic audio information on DVD. The audio attribute information especially related

to this invention is explained among audio attribute information, next the recording information on DVD. Audio attribute information says the attribute of the audio information recorded on DVD, and a concrete target the existence of a coding method, a sampling frequency, a quantifying bit number, the number of channels, and emphasis etc. In this invention, audio attribute information is recorded sequentially from the hierarchy of the low order hierarchy who shows drawing 1 , respectively in CDC in CDC 11 in the audio pack 43 and in each VTS3, and in the video manager 2. Hereafter, these are explained to a detail.

[0059] As mentioned above, although audio information is memorized in the audio pack 43, audio attribute information is first recorded in the audio pack 43. The configuration of the information in an audio pack is shown in drawing 3 . Although the audio data which are not compressed may be recorded, the case of incompressible audio data (linear PCM system) is illustrated as the case where the compressed audio data are recorded as a type of audio information here. That is, drawing 3 shows the content of the audio pack 43 in case the type (coding method) of audio data is Linear PCM.

[0060] The audio pack 43 is constituted by the pack header 64 and the audio packet APT like a graphic display. The read-out initiation time information which is the control information at the time of playback of the data in each pack P, the start code which shows that it is initiation of Pack P are recorded on the pack header 64. Moreover, it has substream ID information 66 including the information which shows whether the audio packet APT is audio data with which the packet header 65 including the information which shows that the data contained in the audio pack 43 concerned are audio data, and the audio data contained in the audio pack 43 concerned are compressed, or it is audio data which are not compressed like this linear PCM system, and the audio frame information 67 that audio frame-number information etc. is described.

[0061] Furthermore, the audio pack 43 has the audio attribute information 68 which is the information about the attribute of the audio data contained in the audio pack 43 concerned. In the case of linear PCM system audio data, this audio attribute information 68 is information, such as existence of the

emphasis of a sampling frequency and a quantifying bit number, the number of channels (when the audio data which the channel of 1 is constituted by the audio data outputted from the loudspeaker of 1, for example, should be outputted from the loudspeaker of the left and the right are included, the number of channels is set to "2".) contained as audio data, and the audio data concerned. The audio pack 43 has audio data 43a which is a stereo part as speech information further, and is constituted by two or more audio frames AF. In the above-mentioned configuration, parts other than the above-mentioned pack header 64 constitute the audio packet APT among the audio packs 43.

[0062] Moreover, audio attribute information is recorded also in CDC 11 in each VTS. The audio attribute information 12 in CDC 11 is shown in drawing 4 . Thus, the attribute information on the audio information included in the VTS concerned is recorded in the CDC 11 about all VTS(s). The example of this audio attribute information 12 is shown in drawing 5 . As audio attribute information, as shown in drawing 5 , 15h of coding methods of audio information, multichannel information 15i, audio type 15j, application type 15k, the quantifying bit number of 15m, the sampling frequency of 15n, number of channels 15o, existence 15p of emphasis, etc. are contained. 15h of coding methods specifies coding methods, such as DORUBI AC 3 and Linear PCM, and audio type 15j specifies whether language (words etc.) is included in the audio information. Application type 15k shows those applications in case the speech information is a multichannel, and contains karaoke, surround, etc. Moreover, the quantifying bit number of 15m and the sampling frequency of 15n show the quantifying bit number in coding of the audio information concerned, and a sampling frequency, respectively. Moreover, number of channels 15o shows the number of channels of the audio information, and existence 15p of emphasis shows whether emphasis is turned on in the audio information.

[0063] Furthermore, audio attribute information is recorded as a part of audio concentration information in CDC in the video manager 2. The example of audio concentration information is shown in drawing 6 . It can be said that the audio concentration information 13 in CDC 11 in the video manager 2 is the set of the audio management information described in CDC 11 in each VTS

so that drawing 6 may show. In the example of drawing 6 , this DVD has three groups and each of this group corresponds to VTS, respectively. As mentioned above, a group is equivalent to one album, such as CD, and is recognized that a different album of three sheets is recorded on DVD of one sheet from the user. Moreover, a truck corresponds to music. In addition, the group 3 of drawing 6 is a group equivalent to an above-mentioned collection. That is, it is constituted by the set of the ontic audio information ontically included in groups 1 and 2 although recognized by the user as an album which is different in groups 1 and 2 seemingly.

[0064] The start address and the end address of each truck are further included in the content of the audio concentration information 13. These are the absolute addresses on DVD. Furthermore, attribute information indispensable to playback of the audio information concerned, such as existence of a sampling frequency, a quantifying bit number, the number of channels, and emphasis, is included at least among the audio attribute information 12 recorded on CDC 11 in each above-mentioned VTS as audio attribute information. The playback time amount of each truck for playback time management etc. and the playback time amount for every group are further recorded on audio concentration information.

[0065] although the audio attribute information 12 is recorded in CDC 11 on each group (VTS) of every as mentioned above and the music in each group can be reproduced by referring to this, in order to acquire these audio attribute information 12 -- every -- CDC 11 in VTS3 must be accessed and the content must be read. Here, since the audio information on an attribute which is different in every group (VTS) in DVD is recordable, it belongs to a different group and two or more music from which an attribute so differs may be reproduced continuously. Such a situation is produced when a user chooses the music in a different group by manual selection first. Moreover, it happens also at the time of a group's rebirth called the collection like the group 3 of drawing 6 . For a collection, it is because it is common that the truck with which it belongs to two or more groups, and audio attributes differ is intermingled as for the ontic audio information on each truck.

[0066] Therefore, since audio attributes, such as a sampling frequency and a

quantifying bit number, change in such a case, time amount for a regenerative apparatus to correspond to this is needed. Supposing the audio concentration information 13 is not prepared in the video manager 2, when reproducing the truck of a different audio attribute after after playback of a certain music, a regenerative apparatus does not understand that an attribute changes until it searchs the audio attribute information in VTS corresponding to the group in whom the truck is included and acquires the attribute of the music corresponding to the following music. Therefore, when the search and track jump (namely, migration of pickup) to the following music are completed comparatively for a short time, before a regenerative apparatus recognizes change of an attribute and completes processing of modification of the frequency of a D/A converter etc., playback of the following music begins, and the nonconformity that the head of music cannot be reproduced correctly may arise. Usually, since the regenerative-apparatus side does not have the composition of reporting completion of setting-out modification, such as modification of a frequency, to the controller which controls reading of DVD, possibility that such a problem will arise is high.

[0067] Then, as mentioned above, by this invention, the audio management information in each CDC 11 of VTS is collected further, this is included in the audio concentration information 13, and it describes in the video manager 2. And the audio concentration information 13 in the video manager 2 is read in the phase where DVD was set in the regenerative apparatus, and it memorizes in the memory in a system controller etc. If the case of collection playback etc. refers to the audio attribute information in audio concentration information by this when the truck of a different audio attribute is reproduced continuously, the audio attribute of the music which should be reproduced next can be known in advance. Thereby, the above problems are avoidable. In addition, about actual processing of a regenerative apparatus, it mentions later.

(II) The gestalt of operation of the recording apparatus for recording audio concentration information including the gestalt, next the above-mentioned audio attribute information on operation of a recording apparatus on DVD1 is explained using <u>drawing 7</u> . The configuration of the recording device of

introduction and this operation gestalt is explained.

[0068] Recording apparatus S1 applied to the gestalt of operation as shown in drawing 7 It is constituted by the audio source 70, memory 71, the signal-processing section 72, hard disk drive units 73 and 74, a controller 75, the multiplex machine 76, a modulator 77, and the mastering equipment 78 as a record means.

[0069] Next, actuation is explained.

[0070] The recording information R which is the raw material of the audio information which should be recorded on DVD1 is temporarily recorded on the audio source 70 for each information of every. And the recording information R temporarily recorded on the audio source 70 is outputted to the signal-processing section 72 by the demand from the signal-processing section 72.

[0071] The signal-processing section 72 carries out A/D conversion of the recording information R outputted from the audio source 70, performs compression processing if needed further, and outputs it as audio signal Sr. Outputted audio signal Sr is temporarily memorized by the hard disk drive unit 73.

[0072] control information (it can set to drawing 1 --) for memory 71 to control playback of the above-mentioned recording information R in parallel to these The control information concerned beforehand inputted into the video manager 2, CDC 11, and Navi-pack 41 list based on the cuesheet ST each control information, such as a pack header for constituting each audio pack 43, etc. was indicated to be is memorized temporarily. It is based on a demand from the signal-processing section 72, and is the control information signal Si. It outputs by carrying out.

[0073] The signal-processing section 72 generates and outputs the access information signal Sac corresponding to above-mentioned audio signal Sr with reference to a time code Tt based on the control information signal Si outputted from the above-mentioned time code Tt and memory 71 which were outputted from the audio source 70, and the access information Sac concerned is temporarily memorized by the hard disk drive unit 74. The above processing is performed about the whole recording information R.

[0074] After the above-mentioned processing is completed about all the

recording information R, a controller 75 is a hard disk drive unit 73 to audio signal Sr. While reading, the access information signal Sac is read from a hard disk drive unit 74, additional information Da is generated based on these, and it is the additional information signal Sa. It carries out and memorizes to a hard disk drive unit 74. The concrete content of the audio concentration information 13 in this operation gestalt is beforehand determined as each group (VTS) of every by the manufacturer of DVD, and is memorized by the hard disk 74. And the audio concentration information 13 and the audio attribute information 12 are included in additional information Da by control of the signal-processing section 72. that is, the audio information 68 (refer to drawing 3) is included in additional information Da as information recorded in each audio pack -- having -- the audio attribute information 12 (refer to drawing 4) -- every -- it includes in additional information Da as information recorded on CDC 11 in VTS3. Furthermore, the audio concentration information 13 (refer to drawing 6) is included in additional information Da as information recorded in the video manager 2.

[0075] On the other hand, a controller 75 performs time management of each actuation of the above-mentioned signal-processing section 72 and hard disk drive units 73 and 74, and generates and outputs the information selection signal Scc for [corresponding to the additional information Da read from the hard disk drive unit 74] carrying out time-axis multiplex [of audio signal Sr and the additional information signal Sa], while carrying out an additional information signal Sa output.

[0076] Then, reading appearance of audio signal Sr and the additional information signal Sa is carried out from a hard disk drive unit 73 or 74, and time-axis multiplex is carried out with the multiplex vessel 76 based on the information selection signal Scc from a controller 75, and they are outputted as an information addition multiple signal Sap. In the phase of this information addition multiple signal Sap, control information and audio information are compounded by the switch actuation which used the information selection signal Scc of a controller 75, and the information which should be recorded has the physical structure (physical format) shown in drawing 1 and drawing 4 . Moreover, each audio pack 43 has structure shown in drawing 3 .

[0077] Then, a modulator 77 modulates addition of error correction codes (ECC), such as a Reed Solomon code, 8 -16 modulation, etc. to the outputted information addition multiprocessing signal Sap, and is the disk record signal Sm. It generates and outputs to mastering equipment 78.

[0078] To the last, mastering equipment 78 is the disk record signal Sm concerned. It records to the La Stampa disk used as the master at the time of manufacturing an optical disk (cutting die). And the optical disk as a replica disk generally marketed is manufactured by the replication equipment which is not illustrated using this La Stampa disk.

[0079] The audio attribute information 68 is included in the audio pack 43 as mentioned above, the audio attribute information 12 is included in CDC 11 in each VTS, and DVD with which the audio concentration information 13 was included in the video manager 2 is created further.

(III) The gestalt of operation of the regenerative apparatus for reproducing the information recorded on DVD1 by the gestalt, next the above-mentioned recording device S1 of operation of a regenerative apparatus is explained using drawing 8 and drawing 9 .

[0080] regenerative apparatus S2 applied to the gestalt of operation as shown in drawing 8 Pickup 80, the recovery correction section 81, and the stream switches 82 and 84, A track buffer 83, a system buffer 85, and a demultiplexer 86, The VBV (Video BufferVerifier) buffer 87, The video decoder 88, the subpicture buffer 89, and the subpicture decoder 90, A mixer 91, the audio buffer 92, and the audio decoder 93, The PCI buffer 94, the PCI decoder 95, and the highlights buffer 96, It is constituted by the highlights decoder 97, the input section 98, a display 99, the system controller 100, the drive controller 101, the spindle motor 102, and the slider motor 103. In addition, the configuration shown in drawing 8 is a regenerative apparatus S2. Only an image and the part about audio playback are indicated among configurations, and since the servo circuit for carrying out servo control of the slider motor 103 grade to pickup 80 and spindle motor 102 list etc. is the same as that of the conventional technique, a publication and details explanation are omitted.

[0081] Next, actuation is explained.

[0082] Pickup 80 receives the reflected light from DVD1 of the light beam B

concerned, and outputs the detecting signal Sp corresponding to the information pit currently formed on DVD1 while it irradiates light beam B as a playback light to DVD1 including the laser diode which is not illustrated, a beam splitter, an objective lens, a photodetector, etc. While light beam B is irradiated by accuracy to the code track on DVD1 at this time, tracking servo control and focus servo control are performed by the same approach as the conventional technique to the objective lens which is not illustrated so that a focus may be connected with the information recording surface on DVD1 to accuracy.

[0083] It is inputted into the recovery correction section 81, and recovery processing and error correction processing are performed, the recovery signal Sdm is generated, and the detecting signal Sp outputted from pickup 80 is outputted to the stream switch 82 and a system buffer 85.

[0084] The stream switch 82 into which the recovery signal Sdm was inputted is the switch signal Ssw1 from the drive controller 101. The closing motion is controlled, and when it is close, through [of the inputted recovery signal Sdm] is carried out as it is, and it outputs to a track buffer 83. On the other hand, when the stream switch 82 is open, the recovery signal Sdm is not outputted and unnecessary information (signal) is not inputted into a track buffer 83.

[0085] The track buffer 83 into which the recovery signal Sdm is inputted outputs the memorized recovery signal Sdm continuously, when the stream switch 84 is made close, while being constituted by FIFO (First In First Out) memory etc. and memorizing the inputted recovery signal Sdm temporarily. A track buffer 83 is for outputting continuously the recovery signal Sdm which originates in the track jump in the above-mentioned seamless playback, and is discontinuously inputted in the case of reading of the data divided into the INTARIBUDO unit IU etc., and canceling interruption of the playback concerned depended discontinuously while compensating the difference of the amount of data for every GOP in an MPEG 2 method.

[0086] The stream switch 84 into which the recovery signal Sdm is inputted continuously is the switch signal Ssw2 from a system controller 100 so that various latter buffers may overflow, or it may become reverse in the sky and

decoding may not be interrupted in the separation processing in a demultiplexer 86. Closing motion is controlled.

[0087] On the other hand, the system buffer 85 into which the recovery signal Sdm is inputted in parallel to a track buffer 83 the management information (video manager 2 grade) about the whole information which is first detected when loading of DVD1 is carried out, and is recorded on DVD1, or CDC 11 for every VTS3 -- accumulating -- control information Sc ******, while outputting to a system controller 100 The DSI data 51 for every Navi-pack 41 are temporarily stored during playback, and it outputs to a system controller 100 as control information Sc.

[0088] Through the stream switch 84, in the demultiplexer 86 inputted continuously, the recovery signal Sdm extracts video-data and audio data 43a, subpicture data, and the PCI data for every Navi-pack from the recovery signal Sdm concerned for every pack, and outputs to the VBV buffer 87, the subpicture buffer 89, the audio buffer 92, and the PCI buffer 94 as a PCI signal Spc at a video signal Sv, the subvideo signal Ssp, and an audio signal Sad list, respectively.

[0089] At this time, a demultiplexer 86 extracts the pack header 64 and packet header 65 grade from each pack (the audio pack 43 is included.) and a packet (the audio packet APT is included.), and outputs them to a system controller 100 by making into the header signal Shd information included in each. The pack header 64 of the audio pack 43 separated in the demultiplexer 86, a packet header 65, the substream ID information 66, the audio frame information 67, and audio data-information 68 grade are contained in this header signal Shd.

[0090] Moreover, audio data 43a divided into the audio pack 43 of the gestalt shown in drawing 3 is contained in the audio signal Sad, and two or more audio frames AF as shown in drawing 3 are contained in each audio pack 43.

[0091] Video signal Sv It is constituted by the FIFO memory etc. and the VBV buffer 87 inputted is a video signal Sv. It accumulates temporarily and outputs to the video decoder 88. The VBV buffer 87 is the video signal Sv compressed by the MPEG 2 method. It is for compensating dispersion in the amount of data of each picture (refer to drawing 2) of every [which can be

set]. And video signal Sv with which dispersion in the amount of data was compensated It is inputted into the video decoder 88, a recovery is performed by the MPEG 2 method, and it is outputted to a mixer 91 as a recovery video signal Svd.

[0092] On the other hand, the subpicture buffer 89 into which the subvideo signal Ssp is inputted accumulates the inputted subvideo signal Ssp temporarily, and outputs it to the subpicture decoder 90. The subpicture buffer 89 is for outputting the subpicture data 44 contained in the subvideo signal Ssp synchronizing with the video data 42 corresponding to the subpicture data 44 concerned. And the subvideo signal Ssp with which the synchronization with a video data 42 was taken is inputted into the subpicture decoder 90, a recovery is performed, and it is the recovery secondary video signal Sspd. It carries out and is outputted to a mixer 91.

[0093] It is mixed by the mixer 91 and the recovery secondary video signal Sspd (the synchronization with the corresponding recovery video signal Svd can be taken.) outputted from the recovery video signal Svd and the subpicture decoder 90 which were outputted from the video decoder 88 is outputted to displays, such as CRT (Cathod Ray Tube) which is not illustrated as a final video signal Svp which should be displayed.

[0094] The audio buffer 92 into which an audio signal Sad is inputted is constituted by the FIFO memory etc., accumulates the inputted audio signal Sad temporarily, and outputs it to the audio decoder 93. The audio buffer 92 is the video signal Sv including the image information which corresponds an audio signal Sad based on the header control signal Shc outputted from a system controller 100. Or an audio signal Sad is delayed according to the output situation of image information of being for making it outputting synchronizing with the subvideo signal Ssp, and corresponding. And the audio signal Sad by which timing was carried out so that it might synchronize with corresponding image information is outputted to the loudspeaker which regeneration in a linear PCM system is given and is not illustrated as recovery audio signal Sadd based on the header control signal Shc which is outputted to the audio decoder 93 and outputted from a system controller 100. In addition, in the audio DVD only including music information, synchronous

processing with image information is unnecessary. The back explains the processing in the audio decoder 93 in full detail.

[0095] When it is detected that there is the need (a pause is carried out) of interrupting voice temporarily in the playback immediately after access to the information on desired etc., from a system controller 100, the pause signal Sca is outputted to the audio decoder 93, and suspends the output of recovery audio signal Sadd temporarily in the audio decoder 93 concerned.

[0096] The PCI buffer 94 into which the PCI signal Spc is inputted is constituted by the FIFO memory etc., accumulates the inputted PCI signal Spc temporarily, and outputs it to the PCI decoder 95. The PCI buffer 94 is for synchronizing a video data, the audio data 43, or subpicture data etc. with which the PCI data contained in the PCI signal Spc and the PCI data concerned correspond, and making PCI data apply to the video data concerned, the audio data 43, or subpicture data. And for the PCI signal Spc which synchronized with a video data, the audio data 43, or subpicture data etc. which corresponds with the PCI buffer 94, parts other than the highlights information on PCI data are the PCI information signals Spci while the highlights information included in PCI data by the PCI decoder 95 is separated and being outputted to the highlights buffer 96 as a highlights signal Shi. It carries out and is outputted to a system controller 100.

[0097] The highlights buffer 96 into which the highlights signal Shi is inputted is constituted by the FIFO memory etc., accumulates the inputted highlights signal Shi temporarily, and outputs it to the highlights decoder 97. The highlights buffer 96 is a buffer for performing time-axis compensation making a change of the display condition of the selections (selection carbon button) corresponding to highlights information to accuracy corresponding to the subvideo signal Ssp with which the image information for the highlights information concerned is included. And for the highlights signal Shi with which time-axis compensation was performed, the information which is decoded in the highlights decoder 97 and included in the highlights signal Shi concerned is the recovery highlights signal Shid. It carries out and is outputted to a system controller 100. This recovery highlights signal Shid The information for setting the register in the above-mentioned system controller 100 as inside is

included.

[0098] Here, a system controller 100 is the recovery highlights signal Shid concerned. It is based, and the above-mentioned highlights control signal Sch will be outputted in order to change the display condition using highlights information. At this time, a system controller 100 is the recovery highlights signal Shid. That selection actuation using the menu screen based on the highlights information concerned etc. should be made effective based on the shelf-life information which shows the shelf-life of the highlights information included, while receiving the selection actuation by the input signal Sin from the input section 98, the above-mentioned highlights control signal Sch will be outputted.

[0099] Furthermore, the control information Sc as which a system controller 100 is inputted from a system buffer 85 PCI information signal Spci inputted from the header signal Shd inputted from a demultiplexer 86, and the system PCI decoder 95 And it is based on the input signal Sin inputted from the input sections 98, such as remote control. In order to perform right playback corresponding to those signals, while outputting the above-mentioned switch signal Ssw2, the stream selection signal Slc, the header control signal Shc, the pause signal Sca, and the highlights control signal Sch Regenerative apparatus S2 In order to display a situation of operation etc., a status signal Sdp is outputted to the display 99 of a liquid crystal display etc.

[0100] furthermore -- again -- a system controller 100 -- the above-mentioned DSI information signal Sdsi etc. -- seamless control signal Scsl corresponding to [as opposed to / when it detects that track jumps, such as a search, need to be processed for seamless playback / the drive controller 101] processing of the track jump concerned It outputs.

[0101] And seamless control signal Scsl The inputted drive controller 101 is a driving signal Sd to a spindle motor 102 or the slider motor 103. It outputs. this driving signal Sd a spindle motor 102 or the slider motor 103 moves pickup 2 so that the record location on DVD1 which light beam B should reproduce may irradiate -- making (referring to drawing 8 broken-line arrow head) -- CLV (Constant Linear Velocity: constant linear velocity) control of the rotational frequency of DVD1 is carried out. When pickup 2 is moving the drive

controller 101 in parallel to this and the recovery signal Sdm is not outputted from the recovery correction section 81, it is the seamless control signal Scsl. It is based and is the switch signal Ssw1. If the recovery signal Sdm begins to be outputted while outputting and making the stream switch 82 open, the stream switch 82 will be closed and the recovery signal Sdm will be outputted to a track buffer 83.

[0102] Next, the configuration and actuation of the audio decoder 93 especially relevant to this invention are explained. The configuration of the audio decoder 93 is shown in drawing 9 . The audio decoder 93 is equipped with the signal-processing section 120 containing a digital filter etc., D/A converter 121, the analog output circuit 122 containing amplifier etc., the digitized output circuit 123, the system microcomputer 124 containing RAM124a, and the clock circuit 125 like a graphic display.

[0103] The system microcomputer 124 exchanges a control signal Sca between system controllers 100, and performs motion control of the clock circuit 125, the signal-processing section 120, D/A converter 121, and the analog output circuit 122. The system microcomputer 124 has RAM124a inside. RAM124a memorizes temporarily the audio attribute information supplied as a control signal Sca from a system controller 100.

[0104] The system microcomputer 124 supplies the content to the clock circuit 125 and the signal-processing section 120 with reference to the audio attribute information memorized in RAM124a. Specifically, the system microcomputer 124 supplies the sampling frequency information in audio attribute information to the clock circuit 125. The clock circuit 125 has an oscillator and supplies the clock signal fs corresponding to the directed sampling frequency to the signal-processing section 120. Moreover, the system microcomputer 124 supplies the information on the existence of the sampling frequency in audio attribute information, a quantifying bit number, the number of channels, and emphasis to the signal-processing section 120, and offers the number information of channels to D/A converter 121. Furthermore, in a system microcomputer, 124 supplies information, such as amplification degree of the signal of each channel, to the analog output circuit 122. The information on the amplification degree for every channel can be

included in audio attribute information, and can be supplied from a system controller 100.

[0105] The signal-processing section 120 uses the clock signal fs from the clock circuit 125, processes a decryption of the audio signal supplied from the audio buffer 92, a band limit, etc. according to information, such as coding methods (Linear PCM or DORUBI AC 3) obtained from the system microcomputer 124, a sampling frequency, and a quantifying bit number, further, performs de-emphasis processing according to the information on the existence of emphasis, and outputs it to D/A converter 121. D/A converter 121 divides the inputted signal for every channel according to the channel information acquired from the system microcomputer 124, and outputs it to the analog output circuit 122 as an analog signal for every channel further. The analog output circuit 122 performs proper magnification processing for every signal of each channel, and outputs it to the loudspeaker which is not illustrated as an analog audio signal.

[0106] Moreover, the signal-processing section 120 outputs digital audio signal Sadd to the exterior through the digitized output circuit 123.

[0107] Next, the actuation at the time of playback of the audio decoder 93 is explained. Next, if the truck (music) which should be reproduced is specified, a regenerative apparatus S2 will perform motion control in the audio decoder 93 according to the audio attribute information on the specified truck with reference to the audio attribute information in the audio concentration information 13 in the video manager 2. Into the audio concentration information 13 in the video manager 2, the address information on DVD with which each truck is recorded as shown in drawing 6 is also recorded. Therefore, based on this address information (start address), a control signal Scsl is moved to the drive controller 101, and it moves [system controller / 100] delivery and pickup 80 to the above-mentioned start address. This processing is promptly started after playback directions of the truck concerned by the user. That is, it carries out in parallel to the control in the above-mentioned audio decoder 93, and a time amount target.

[0108] After making it move to the start address of a truck to which pickup 80 was directed, a system controller 100 makes pickup 80 a standby condition

temporarily. That is, reading is not started promptly. This is for ensuring that reading (playback of a truck) is performed, after setting out of the audio attribute in the above-mentioned audio decoder 93 is completed. although the time amount take that a system controller 100 and the system microcomputer 124 in an audio decoder 93 complete setting out of the audio attribute in an audio decoder 93 be almost fixed in the same regenerative apparatus , the time amount which the external digital amplifier which be illustrate to the digitized output signal a signal be outputted from a digitized output circuit 123 , and a DA converter lock can change by the device , and be usually 1 to 2 seconds , and most the things for which it exceed 5 seconds find . Moreover, the time amount which making it move to the truck on which pickup 80 was directed takes is changed according to the location on DVD of a migration place truck (travel). Therefore, in moving pickup to the comparatively near address on DVD, it completes migration for a short time. In that case, when reading (playback) is promptly started after migration termination of pickup, setting out of the audio attribute in the audio decoder 93 is not completed, but the case where the external digital amplifier and DA converter which reproduced or carried out point ** of the audio signal correctly do not lock may arise. After a system controller 100 moves pickup 80 to a corresponding start address, it is made to stand by between the predetermined time amount X, and makes reading start after that from this reason. The time amount in which external digital amplifier and a DA converter usually lock the time amount which setting out of the audio attribute in the audio decoder 93 takes for 1 second is about 1 to 2 seconds, and since it cannot hardly exceed 5 seconds, according to the processing speed of a system, a user can determine the standby time of pickup 80 as a function of DVD in 0.5 seconds thru/or 5 seconds. Of course, default setting out is also possible.

[0109] Next, continuation playback control of two or more trucks (music) is explained with reference to the flow chart of drawing 10 . In addition, at the time of initiation of the flow chart of drawing 10 , playback of a certain music recorded on the same DVD shall already have been performed. Moreover, the audio concentration information 13 shown in drawing 6 is beforehand read in the video manager 2 of DVD, and is memorized in memory 100a in a system

controller. In addition, actuation of <u>drawing 10</u> is performed mainly with a system controller 100 and the system microcomputer 124 in the audio decoder 93.

[0110] First, a system controller 100 receives modification directions of music (step S1). When receiving modification directions of music, there are various modes. For example, it is the case where a user chooses one of two or more groups recorded on DVD, and reproduces this. For example, when a user chooses a group 1 with reference to the audio concentration information on <u>drawing 6</u> , a system controller 100 reproduces from a group's 1 truck 1 to the truck 6 in order. Under the present circumstances, modification directions of music will be carried out to a truck 2, a truck 3, and order from a truck 1, and music modification directions are given to a system controller 100 at the time of playback termination of each truck.

[0111] If modification directions of music are made next, the system microcomputer 124 will output digital "0" data for a control signal to the signal-processing section 120 with the digital filter of delivery and the interior to D/A converter 121 (step S3). Thereby, the output analog signal of a D/A converter serves as zero level, and, as a result, mute of the audio output is carried out.

[0112] Next, a system controller 100 acquires the audio attribute of the truck which should be reproduced next with reference to the audio concentration information 13 in memory 100a (step S5). In this case, the audio attribute information acquired contains the existence of a sampling frequency, a quantifying bit number, the number of channels, and emphasis at least. Moreover, a system controller 100 acquires the next start address and the next end address of music from the audio concentration information 13 simultaneously.

[0113] Next, a system controller 100 sends the acquired audio attribute information to the system microcomputer 124 in the audio decoder 93. The system microcomputer 124 compares the received audio attribute information with the audio attribute information on a truck which is memorized by internal RAM124a at the event and which was being reproduced to current (step S7). Since modification of audio attribute setting out in the audio decoder 93 is unnecessary when both are in agreement, it shifts to regeneration not more

than step S15.

[0114] On the other hand, when both are not in agreement, setting-out modification of the audio attribute in the audio decoder 93 is needed. Therefore, the directions which the system microcomputer 124 controls [directions] the clock circuit 125, modification of the frequency fs of a sampling clock is directed [directions] (step S9), and the signal-processing section 120 is controlled [directions] further, and make the digital "0" data of the sampling frequency after modification and a quantifying bit number output to D/A converter 121 are performed first (step S11). By this, D/A converter 121 will change the sampling frequency for D/A conversion by an internal PLL circuit etc. Furthermore, the system microcomputer 124 controls the signal-processing section 120, and directs a switch of the existence of emphasis, and a switch of the number of channels (step S13). By these steps S9 thru/or processing of S13, modification directions of the audio attribute in the audio decoder 93 are completed. In addition, although actual setting-out modification processing within the audio decoder 93 usually requires about 1 second as mentioned above, there is little change at the value of a device proper. However, as for the external digital amplifier and DA converter to which a digitized output is connected, lock time amount differs separately. In consideration of this time amount, said standby time X is determined beforehand. In addition, a user can also set up this standby time X as a function of a player.

[0115] Next, measurement of the elapsed time (search time) T after a system controller 100 emits the search directions for which pickup 80 is moved to the start address acquired at step S5 to the drive controller 101 (step S15) and emitting the directions is started (step S17). Next, it is judged whether migration of pickup was completed (step S19), and if it completes, the measurement of predetermined search-time T which carried out progress **** will be ended (step S21).

[0116] Next, a system controller 100 is compared with the predetermined standby time X which mentioned measured search-time T above. Search-time T considers that audio attribute modification in (step S23:NO) and the audio decoder 93 and the lock of external digital amplifier and a DA converter are

already completed, in being larger than a standby time X, it emits playback directions of the truck concerned, and cancels the mute of an audio output (step S27). Thereby, playback of the truck concerned is started. On the other hand, when smaller than a standby time X (step S23: YES), search-time T emits playback directions of the truck concerned, after, as for a system controller 100, only the time amount of both difference (X-T) stands by (step S27). Continuation playback of music is performed as mentioned above.

[0117] In continuation playback of music, the example when not changing with the case where an audio attribute changes is described. In playback of DVD which has the audio concentration information on <u>drawing 6</u> , supposing a user directs that a group's 1 trucks 1-6 reproduce in order, the modification directions to the next truck will be given to a system controller 100 at the time of playback termination of each truck. However, in this case, since the next truck is the same audio attribute, step S7 serves as YES and playback of the next truck continues it with the same audio attribute.

[0118] Suppose that the user, on the other hand, directed to reproduce a group's 3 trucks 1-5 in order. Since a group 3 is a group of a collection, the audio attributes of the truck included in it may differ. For example, since an audio attribute changes to a truck 2 when playback shifts to a truck 5 from a truck 4, step S7 serves as NO from a group's 3 truck 1 to it, setting-out modification for a new audio attribute is made within the audio decoder 93, and playback is started after that.

[0119] In this case, supposing audio concentration information is not recorded in the video manager 2 of DVD In case the attribute information on the next truck is acquired at step S5, a system controller 100 retrieves the audio attribute information 12 (refer to <u>drawing 4</u>) on VTS that the music which corresponds out of CDC 11 for two or more VTS(s) of every memorized in internal-memory 100a is contained. It will be necessary to acquire the same audio attribute information with reference to this. Therefore, time amount after receiving modification directions of music until modification of the audio attribute in the audio decoder 93 is completed becomes long. If playback of the following music is started without waiting for the completion of modification of an audio attribute, it will become impossible therefore, to reproduce the

head of music correctly. Moreover, even if it supposes the completion of modification of an audio attribute that playback initiation is waited and carried out and carries out it, there is a problem that it will be kept waiting time considerable to playback initiation of the following music.

[0120] According to this point and this invention, since audio attribute information is recorded as a part of audio concentration information in the video manager 2, quick playback is attained, without being able to acquire the audio attribute of the following music promptly and producing the above problems by referring to this. Moreover, since the time amount for modification of the audio attribute in the audio decoder 93 and time amount for external digital amplifier and a DA converter to lock are secured irrespective of the time amount which migration (search) of pickup on the next truck takes since it is constituted between the predetermined standby times X so that playback may not be started after there are modification directions of music, right playback is guaranteed.

Explanation of DVD which does not have audio concentration information in a video manager of the playback above explained playback of DVD with which audio concentration information is recorded in the video manager. However, quick playback can be performed, without producing the above-mentioned problem with the following alternative ways, even when audio concentration information is not recorded in the video manager.

[0121] Usually, when Audio DVD is set in a regenerative apparatus, the information in the video manager 2 and CDC 11 in each VTS is memorized by memory 100a in a system controller 100. Therefore, an audio concentration information table as shown in drawing 6 using the audio attribute information 12 in each VTS etc. at this event is created, and it memorizes in the memory in a regenerative apparatus. First, a system controller 100 acquires each record address of VTS with reference to the VTS information in the video manager 2, and, specifically, acquires the audio attribute information which moves to the address and is included in CDC 11 in the VTS concerned. And the content is read and it forms in internal-memory 100a. Next, PGCI which constitutes PTT which corresponds from the PTT search pointer currently recorded in the VTS concerned, and PGC are specified, the record address

on DVD of the audio information (truck) corresponding to the PTT concerned is detected, and it memorizes in the above-mentioned memory 100a. By performing the above actuation to all VTS(s), a system controller 100 forms a concentration information table as shown in drawing 6 in memory 100a.

[0122] And in the case of playback, if modification directions of music are received, same playback will be performed not with reference to the audio attribute information 12 in each VTS but with reference to the content of the audio concentration information table which was created beforehand and memorized by memory 100a. Equivalent effectiveness can be acquired even when this reproduces DVD of the type with which audio concentration information is not recorded in the video manager.

[0123] In addition, in the above-mentioned explanation, although playback of the truck in the group who is a collection was taken for the example as an example at the time of an audio attribute changing, application of this invention is not restricted to this. For example, when specifying the music which a user reproduces for every music, it arises that the audio attributes of the truck reproduced also succeeding a case as the user specified a certain truck in a group 2 as following music during playback of a certain truck in the group 1 of drawing 6 differ. This invention can be applied when [all] two or more trucks (music) are reproduced continuously in this way. Moreover, in the application which connects the music of the same attribute at random, and is reproduced and recorded, the function as for which between the music is made to regularity is realized.

[0124]

[Effect of the Invention] As explained above, according to invention according to claim 1, the unit attribute information corresponding to all the set audio information on the record medium concerned is recorded as set attribute information. Therefore, the attribute of all unit audio information can be acquired easily and promptly by referring to set attribute information.

[0125] According to invention according to claim 2, since it is constituted so that it may be arranged in the location first read in said information record medium, if a regenerative apparatus is equipped with an information record medium, said set attribute information will be read first and the playback

control of said set attribute information based on the information concerned will be attained.

[0126] According to invention according to claim 3, said set attribute information includes the information on the sampling frequency at the time of encoding said unit audio information at least, a quantifying bit number, the number of channels, and the existence of emphasis processing. Therefore, a regenerative apparatus can acquire this information easily and the quick playback of it is attained.

[0127] According to invention according to claim 4, 5, 8, or 9, playback of unit audio information is performed with reference to the set attribute information table created from the set attribute information recorded on the information record medium, or unit attribute information, a regenerative apparatus making setting out and its modification of an attribute.

[0128] Therefore, the attributes of the unit audio information which should be reproduced continuously differ, even when setting-out modification which corresponds in a regenerative apparatus is needed, the attribute of the unit audio information which should be reproduced next can acquire from set attribute information or a set attribute information table promptly, and a setting-out change of a regenerative apparatus is made easily and promptly.

[0129] According to invention according to claim 6 or 10, after playback of one unit audio information is completed, a reading means is moved to the record location of the unit audio information which should be reproduced next, and playback of the unit audio information concerned is started after predetermined standby-time progress from migration initiation. Therefore, even when the attribute of the unit audio information which should be reproduced next changes, it is secured that playback is started after modification of the attribute corresponding to it is completed.

[0130] According to invention according to claim 7 or 11, let a standby time be time amount longer than the time amount which modification of attribute setting out by said attribute modification process takes. Therefore, when the unit audio information that attributes differ is reproduced continuously, before attribute setting-out modification by the side of a regenerative apparatus is completed, it is lost that playback of the following unit audio information is

started, and shift of the information reproduced is performed smoothly.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the physical structure (physical format) of recording information.

[Drawing 2] It is drawing showing the logical configuration (logical format) of recording information.

[Drawing 3] It is drawing showing the example of the structure of an audio pack.

[Drawing 4] It is drawing showing the record location of audio attribute information and audio concentration information.

[Drawing 5] It is drawing showing the content of the audio attribute information in VTS.

[Drawing 6] It is drawing showing the example of a content of audio concentration information.

[Drawing 7] It is the block diagram showing the outline configuration of a DVD recording apparatus.

[Drawing 8] It is the block diagram showing the outline configuration of a DVD regenerative apparatus.

[Drawing 9] It is the block diagram showing the outline configuration of an audio decoder.

[Drawing 10] It is the flow chart which shows the control at the time of continuation playback of music.

[Description of Notations]

1 -- DVD

2 -- Video manager

3 63 -- VTS

10 -- VOB

11 -- CDC

12 -- Audio attribute information

13 -- Audio concentration information

20 -- Cel

30 -- VOB unit

41 -- Navi-pack

60 -- Program

61, 61A, 61 B--PGC

62 -- Title

70 -- Audio source

71 -- Memory

72 -- Signal-processing section

73 74 -- Hard disk drive unit

75 -- Controller

78 -- Mastering equipment

80 -- Pickup

83 -- Track buffer

85 -- System buffer

92 -- Audio buffer

93 -- Audio decoder

98 -- Input section

99 -- Display

100 -- System controller

101 -- Drive controller

B -- Light beam

S1 -- Recording device

S2 -- Regenerative apparatus